W09a Collision between the stellar wind and the accretion disk in misaligned Be/X-ray binaries

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About a half of high-mass X-ray binaries consist of a neutron star and a Be star. Here, a Be star is a massive star with a fast polar wind driven by stellar radiation and a dense equatorial disk formed by viscous diffusion of gas ejected from the stellar equatorial surface. Since these Be/X-ray binaries have, in general, eccentric orbits as a result of aspherical supernova explosions when neutron stars were born, it is likely that the binary orbital plane in these systems is also misaligned with the equatorial plane of the Be star. In such systems, when the neutron star captures gas from the Be star's disk for a short period of time around periastron, the resulting accretion disk is most likely tilted to the equatorial plane of the Be star. This leads to an interesting possibility that, in misaligned Be/X-ray binaries, the polar wind of the Be star collides with the accretion disk and significantly affects the accretion flow structure by its large ram pressure.

In this talk, I will study the effects of the Be star's wind on the accretion disk in misaligned Be/X-ray binaries. First, using simplified wind and disk models, I will analytically compare the wind ram pressure with the gas pressure of the accretion disk, in order to constrain the parameter range for full stripping of the accretion disk. Then, I will discuss the wind-disk interaction in more detail, on the basis of the result from 3D SPH simulations of the collision between the stellar wind and the accretion disk in these binary systems.